REVIEW OF GOVERNMENT RESOURCES AND CHANGING PROGRAM THRUSTS AS THEY RELATE TO DELIVERY OF PROGRAMS UNDER THE GREAT LAKES WATER QUALITY AGREEMENT

GREAT LAKES WATER QUALITY BOARD
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INTRODUCTION

The Great Lakes Water Quality Board (WQB) is principal advisor to the International Joint Commission on all matters relating to the U.S.-Canada Great Lakes Water Quality Agreement (GLWQA). The WQB, among other things, is charged in its terms of reference to "keep informed regarding programs and other measures taken with respect to, or relevant to, implementation of the Agreement and shall address the adequacy and effectiveness of such programs."

In 1997, the WQB was requested by the International Joint Commission to undertake a review of government resources and changing program thrusts as they relate to delivery of programs under the GLWQA. At a minimum, the Commission requested that this review include: monitoring and surveillance activities, Area of Concern commitments, and regulatory and enforcement activities. In November 1997 the WQB initiated a survey of key state, provincial, and federal agencies with responsibilities for delivery of programs under the GLWQA. This survey requested:

- descriptive information on the nature and rationale for recent changes in program thrusts and government resource support as they relate to delivery of programs under the GLWQA; and

- economic information on selected indicators of government programs.

Both the descriptive and economic information was reviewed and evaluated to gain insight into resource trends within individual jurisdictions/Parties and the impact on program effectiveness. The purpose of this report is to summarize the key findings of the survey and to present advice to the International Joint Commission on the delivery of programs under the GLWQA.

SURVEY METHODS

First, the WQB recognized that geographical, political, and administrative differences among the jurisdictions/Parties represented considerable challenges in undertaking the survey. Secondly, the WQB recognized that Great Lakes programs should be evaluated based on measuring outcomes (i.e., performance and results). However, this review of government resources and changing program thrusts would provide useful information on recent trends within agencies as an initial step toward evaluating our ability to meet commitments in the GLWQA.

The survey was initiated in November 1997. It requested a narrative description of any recent changes in program thrusts and government resource support as they relate to delivery of programs under the GLWQA. Specifically, agencies were asked to address the following questions in their narrative descriptions:

- How has program delivery changed (if it has)?

- What program elements are not being done and why?

- How are programs being delivered in new and potentially more effective ways?

In support of these narrative descriptions of program changes, agencies were also asked to provide the WQB with economic information on selected indicators of government resources and changing program thrusts. These indicators include: tributary monitoring, open lake monitoring, air deposition monitoring, fish contaminant monitoring, fish population monitoring, other monitoring, remedial action plan (RAP) activities, lakewide management plan (LaMP) activities, enforcement/compliance programs, permitting programs, and other programs. Each agency was asked to report the total resources expended on each program indicator for 1994, 1995, 1996, and 1997. Therefore, comparisons among years within any individual agency are, in general, valid because of standardized accounting and reporting practices. However, any attempt to compare data among agencies is not valid because of agency differences in accounting and reporting practices. In addition, any attempt to report total, annual, resource expenditures for all agencies is not valid because of problems associated with "double accounting" (i.e. some states reported on federal pass-through dollars that were also reported by the U.S. Environmental Protection Agency) and because of the lack of consistency in reporting on indicators among agencies. Again, the purpose of this exercise was to gain insights into resource trends within individual jurisdictions/Parties and the impact on program delivery. Even though this survey was not comprehensive, the WQB felt that it would provide useful information on indicators of trends within agencies.

The WQB developed the survey instrument to help compile economic information which would complement narrative descriptions of any recent changes in program thrusts and government resource support as they relate to delivery of programs under the GLWQA. The WQB recognized that there would undoubtedly be a need to coordinate with other jurisdictional agencies to report on certain indicators. In addition, the WQB recognized that a number of "judgement calls" would have to be made by each agency regarding what programs would be reported on and how. For example, it could be practical for some jurisdictions to report on all their programs, even though some of the resources are expended outside the Great Lakes Basin. In addition, there was concern about "double accounting" so it was suggested that jurisdictions report all dollars and highlight those that are federal pass-through dollars. Each agency was asked to make their own decision as to how to best report program information (e.g., total agency resources or agency resources devoted exclusively to the Great Lakes) and provide the rationale for the decision.

The WQB also recognized the potential problems associated with reporting on issues like enforcement/compliance. Each agency was asked to use their best judgement as to how best to report out on the different categories. In addition, agencies were encouraged to attach as much explanation (under the comments section of the survey form) as they felt was necessary. The WQB wanted to obtain agency insights into:

- program changes;
- how agencies are managing any changes/transitions; and
- how this affects environmental outcomes.

In conducting the following analysis, the WQB has relied exclusively upon the information provided by the agencies in response to the survey. No attempt has been made to verify the

information provided, or gather additional information, using other sources such as public accounts. The WQB has assumed that, in responding to the survey, all agencies have provided accurate and representative information regarding program resource changes over the survey period.

SURVEY CONSIDERATIONS AND KEY ISSUES

As noted in the survey methods section, there are a number of considerations and key issues that must be taken into account when interpreting the information and data from this survey. First, there is little or no uniformity in accounting/reporting among the different agencies. For example, discretionary inclusion/exclusion of items from the survey results in inconsistent funding estimates. This makes comparisons among agencies not possible. However, the annual data from individual agencies will provide an opportunity to gain insights into recent resource trends within agencies. It should also be noted that no correction factor was employed in the comparison of 1994-1997 resources. Several agencies pointed out that there is potential for "double accounting" of resources in the U.S. as some states did not identify state- versus federally-derived funds. Also, in some cases budgeting procedures did not allow for a distinction to be drawn between Great Lakes activities and those conducted outside the Great Lakes drainage basin.

Another important issue that must be recognized is that this survey did not account for support from local governments, RAP groups, and other organizations which would have an impact on certain indicators. Such partnerships with outside organizations are a good example of capacity building and may offset any funding reductions at the state/provincial/federal level that may have occurred. In fact, such partnerships may indeed increase overall resources. It should also be recognized that resource reductions may reflect more efficient or streamlined practices and, in some cases, resource reductions have been the catalyst for innovative approaches and partnerships. It is also possible that some resource shifts may have been planned into program design, rather than result from restraint or other factors.

The WQB has taken these considerations and key issues into account in undertaking this evaluation. Again, the WQB advocates that Great Lakes programs should be evaluated based on measuring ecosystem outcomes (i.e., performance and results). However, given that ecosystem results can take many years to be achieved and verified, the WQB recognizes the need for other indicators of continuing commitment to achievement of GLWQA objectives, such as change in agency resource levels. These resource survey data and information should be viewed as program indicators. These survey data can provide important insights, but will require a much larger effort to truly evaluate out ability to meet commitments in the GLWQA.

DESCRIPTION OF RECENT AGENCY PROGRAM CHANGES

Each agency was asked to provide a narrative description of any recent changes in program thrusts or government resource support as they relate to delivery of programs under the GLWQA. All information is taken at "face value." Presented below, in alphabetical order, are succinct responses from each of these agencies.

Canada - Department of Fisheries and Oceans (DFO)

Between fiscal year (FY) 1994 and FY 1997, the DFO Great Lakes research program downsized its scientific staff by 40% and operating budgets by 70% (Update: as of April 1, 1998 DFO has restored 25% of its person year downsizing reductions; these resources will be primarily applied to its habitat research program). Staff reductions between FY 1994 and FY 1997 occurred primarily within DFO's Environmental Toxicology Program, but most of those people transferred to the National Water Research Institute at the Canada Centre for Inland Waters (Department of Environment). Therefore, their expertise remains within the Great Lakes Basin, and they continue to address toxicology issues on the Great Lakes. Their departures necessitated important changes in research priorities within DFO.

Toxicology research in the Hamilton Harbour, Jackfish Bay, Peninsula Harbour, Toronto Harbour, and the Spanish River has been discontinued, but the work continues in the Department of Environment. Cause and effect studies to further define Water Quality Objectives are also now within the Department of Environment program.

DFO Survey Results

Indicator	*Trend (based on % Change - 1997 vs. average of 1994-97)*
Annex 2	⇑ (>10% increase)
Monitoring & Surveillance	⇓ (>10% decrease)
Regulatory & Enforcement	no data provided

Note: Based on the indicator data provided by the agency

The Great Lakes Laboratory for Fisheries and Aquatic Science toxicology program in Burlington is now focused on fish contaminant surveillance and a number of associated projects which include the tissue archive, chemical analyses for new chemicals, and modeling to understand how changes in energy flow and habitat influence contaminant concentrations in fish. DFO continues this research because it is one of the most useful and successful components of the Great Lakes surveillance program. DFO continues to support toxicology research in the Great Lakes through its national Strategic Science Toxic Chemicals Program.

Since 1972, Great Lakes Laboratories for Fisheries and Aquatic Science has been an important partner to the GLWQA and is no less committed for the future. DFO has contributed significantly to the development of Water Quality Objectives, RAPs, LaMPs, fish contaminants monitoring, and long-term monitoring of primary productivity in the open lake and Areas of Concern. DFO has also contributed to an understanding of exotic species in the Great Lakes and to the restoration of fish habitat and species recovery. Program Review decisions resulted in a smaller Great Lakes program starting in 1995. Some DFO monitoring programs, such as the open lakes Bioindex Program (primary and secondary production), had sufficient momentum and B-Base funding to continue into 1995, but the program could not be sustained because of the loss of a vessel and operating support. DFO is still looking for innovative ways to continue the work using other platforms in the Coast Guard fleet.

DFO has focused a smaller science program to meet core DFO priorities. These include research to support the Fish Habitat Management Program and the Great Lakes Sea Lamprey Control Program. There is some commonality in the science needs of Fish Habitat Management and habitat research for RAPs, and every effort is made to overlap programs whenever possible. Great Lakes Laboratory for Fisheries and Aquatic Science has received funding support from Department of Environment's Great Lakes 2000 Cleanup Fund to continue habitat and water quality work in Hamilton Harbour, the St. Mary's River, and Severn Sound.

Activities reduced or discontinued by DFO include:

- •open lake monitoring of primary and secondary production;
- •effects of toxic chemicals on Great Lakes biota (transferred to Department of Environment); and
- •some RAP activities (toxicology, monitoring).

Core science activities supported or expanded by DFO include:

- •fish contaminant surveillance and a tissue archive;
- •distribution and impact of exotic species;
- •sea lamprey research;
- •habitat research to support the DFO regulatory role under the Fisheries Act; and
- •advice and participation in the Lake Erie LaMP and some RAPs.

While the overall program may be smaller going into the new millennium, DFO believes its contributions to the GLWQA will grow. DFO is especially proud of the new leadership role it is taking on habitat losses and exotic species invasions – two priority issues for DFO's Great Lakes program which do not appear to have as high a profile in the IJC's priorities as the Department would expect. It is DFO's belief that "biological integrity" of the Great Lakes Basin Ecosystem (as per Article II – Purpose in the GLWQA) can never be achieved until biological pollution is accorded the same priority as chemical pollution. DFO is committed to maintaining and expanding its Great Lakes commitments in support of this goal.

Canada - Environment Canada (EC)

Canada's commitments under the GLWQA, delivered through the Great Lakes 2000 program, were announced in 1994 as a six year $150 million partnership among seven federal departments. The EC share of this program was $110 million or 73%. Under Program Review, EC reviewed its activities in relation to the Great Lakes 2000 Program and assessed a reduction of 30% on the 1994-1995 base to be applied over the three-year Program Review period. This results in an

actual cut of 15% over the six-year life of the program. EC then extended the Great Lakes 2000 Program by one additional year at a resource level of $12.9 million, effectively permitting EC to continue to deliver on all commitments spread over a seven-, rather than a six-year period.

The Canadian Great Lakes Program is delivered through the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem (COA), also signed in 1994. Both Canada and Ontario have recently recommitted to COA and, through the COA Review Committee, have been reviewing the ability to meet the 50 plus targets embodied in COA. While the assessment is still ongoing, initial results point to an ability to meet the majority of targets, although some of the original time frames will slip. Progress is being achieved through innovative management strategies.

Environment Canada Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇒ No Change (+/-10%)
Regulatory & Enforcement	⇒ No Change (+/-10%)

Note: Based on the indicator data provided by the agency

The Second Progress Report under the Canada-Ontario Agreement indicates that key commitments have been achieved and resulted in many accomplishments. The Annex entitled Detailed Report on Activities and Results can be found under the URL: http://www.cciw.ca/glimr/data/coa-second-report/.

General comments include:

- EC has not dropped any activity and, although transaction costs associated with stretching the time frame have increased, the Department is still working towards achievement of the Great Lakes Program results.

- EC's contribution to the Great Lakes Program is a combination of funding from a specific allocation (Great Lakes 2000) and substantial support for Great Lakes activities through an on-going Departmental A-base funding.

- By the very ecosystemic nature of the Great Lakes Program and the important role the Great Lakes basin itself plays in the Ontario Region, there is a mutually supportive relationship between the Great Lakes Program and other Environment Canada programs in the region. The synergies created within the Department, between the Department's A-base programs and the Great Lakes program, and with partners, for example the province, all contribute to the results being delivered under the Great Lakes Program.

- The Great Lakes Program is integrated to such an extent that differentiating between federal and provincial contributions to achievement of the same result can be difficult.

- EC has been successful in developing new, cost effective and innovative implementation arrangements for several RAPs.

•In reviewing budget figures, it is important to recognize that Great Lakes 2000 was designed as a six-year program with a decreasing resource base over time and so not all dollar changes can be attributed to fiscal restraint measures.

Canada - Health Canada

Health Canada's Great Lakes Health Effects Program (GLHEP) works within the targets set out in the 1994 COA. Overall program resources have decreased by about 40% since approval of the program in 1994. Health Canada has extended the six-year GLHEP by one year, to 2001, but at a reduced yearly funding level. This will provide the program with an additional year in which to work on its targets. However, as a result of overall resource cuts, GLHEP has reduced the extent of most of its activities and is reviewing its program delivery on an ongoing basis. GLHEP continues to take a multidisciplinary approach and works in partnerships in order to meet the COA targets.

Health Canada Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇒ No Change (+/-10%)
Monitoring & Surveillance	⇓ (>10% decrease)

Note: Based on the indicator data provided by the agency

Canada - Public Works and Government Services Canada (PWGSC)

Over the past several years, PWGSC, like other Canadian federal government departments, has had to adjust to significant reductions in its budgetary allocations. It has, however, managed to participate fully in the Great Lakes related activities during this time. The Department will continue its active involvement and contribute towards the implementation of the GLWQA by providing services relating to its area of expertise and in keeping with our Common Service mandate.

PWGSC also owns a number of waterlots and properties in the Great Lakes Basin. PWGSC has had a program in place over the last several years for conducting environmental audits on all its property holdings. The properties and waterlots which were found to be "contaminated" and could potentially have an adverse impact on the Great Lakes ecosystem in particular, and the environment in general, have been further investigated and documented. PWGSC has drawn up action plans to address the environmental issues on its contaminated properties. In fact, a few remedial projects at some critical sites in the Basin have already been implemented in partnership with Environment Canada and other regulatory and local bodies. No doubt, the budgetary restraints have impacted the PWGSC environmental program to some extent, forcing adjustments in the scheduling and implementation of the monitoring and remedial plans. However, the PWGSC's commitment to proceed with the proposed remediation of its contaminated sites remains unchanged.

Also, a number of the PWGSC properties in the Great Lakes Basin, including a few water lots,

have been identified as surplus to the departmental needs. PWGSC is presently in the midst of conducting environmental evaluations of such holdings in accordance with the Treasury Board and regulatory requirements for the divestiture of federal properties. It is anticipated that some environmental remedial works will be undertaken at these sites as a part of the divestiture program, thus further contributing to the betterment of the Great Lakes ecosystem.

All of PWGSC's physical works in the Great Lakes thus emanate either from property ownership in the Basin or from conducting marine projects on behalf of the client departments. As a Common Service federal government department, PWGSC is not mandated to conduct monitoring and surveillance, RAP, LaMP, or Regulatory and Enforcement activities in the Great Lakes. Therefore, no additional information was provided.

Canada - Transport Canada

Of most importance to the IJC and your inquiry is the 1995 implementation of a decision to move the majority of departments within the Canadian Coast Guard of Transport Canada to the DFO. From the GLWQA standpoint, Marine Safety of Transport Canada was assigned responsibilities under Annexes 4, 5, and 6; the Canadian Coast Guard was assigned responsibilities under Annexes 6, 8, and 9; and the DFO (Science) under Annex 6 - specifically related to studies involving "ballast water".

Like all Canadian federal government departments in the last few years, downsizing and decreased resources, both human and financial, have been a fact of life. The realities of the above transition are best reflected in human resources. Prior to 1995, within Transport Canada - the Canadian Coast Guard, under both the auspices of Rescue and Environmental Response and Ship Safety, had approximately ten persons dedicated full time to putting in effect the programs under Annexes 4, 5, 6, 8, and 9. Today, from the realigned Transport Canada, there is one staff officer looking after Annexes 4, 5, and 6 on a part time basis, available as required. However, Transport Canada has delivered on programs under Annexes 4, 5, and 6 as required.

However, despite these reductions and comparable ones in the other federal departments on both sides of the border, all agencies continue to have a strong commitment to Great Lakes environmental issues. The human resource reductions have caused an even closer relationship to develop between the parties and all continue to work closely together on ballast water, marine sanitation devices, and other pollution regulatory issues. Changes in finances available for program delivery have paralleled the decrease in human resources. However, Transport Canada remains committed to its responsibility under the GLWQA. In an era of change, Transport Canada's response to existing responsibilities is both innovative and credible.

Illinois Environmental Protection Agency (EPA)

The State of Illinois has continued a constant or growing program for Great Lakes surveillance and protection. For the ten specific indicators which information was requested by the Great Lakes Water Quality Board, none showed a decline in resource commitment over the 1994 to

1997 time frame.

In the area of monitoring and surveillance, the State has increased it's commitment to both fish population and fish contaminant monitoring in the last few years. There has also been steady growth, statewide, in all aspects of the states regulatory and enforcement programs. Finally, the State has made a major effort to utilize federal nonpoint source grants in the Lake Michigan basin, with over $700,000 spent in FY 1997.

Illinois EPA Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇒ No Change (+/-10%)
Monitoring & Surveillance	⇒ No Change (+/-10%)
Regulatory & Enforcement	⇑ (>10% increase)

Note: Based on the indicator data provided by the agency

Indiana Department of Environmental Management (DEM)

Indiana DEM remains committed to its programs to restore and maintain the Great Lakes. Although there has been some reduction in resources, there have been a number of program improvements and partnerships which demonstrate Indiana DEM's commitment to the GLWQA. Highlights of such program improvements and partnerships include:

Indiana DEM Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇓ (>10% decrease)
Regulatory & Enforcement	⇑ (>10% increase)

Note: Based on the indicator data provided by the agency

- moving forward on implementing the Grand Calumet Harbor/Indiana Harbor Ship Canal RAP with the Citizen's Advisory for the Remediation of the Environment (CARE) Committee and other stakeholders;

- working in partnership with the U.S. Army Corps of Engineers and industries to develop a comprehensive strategy to address contaminated sediment in Grand Calumet Harbor/Indiana Harbor Ship Canal;

- coming to closure on the air toxics inventory for Indiana;

- completing the first U.S. air rule governing sinter plants at the four steel mills in the Northwest Indiana region (this will decrease toxics and volatile organic compounds substantially from these steel mill 'recycling' outfits);

- targeting $200,000 from an enforcement settlement with a steel company on air monitoring;

•moving forward on the Natural Resources Damage Assessment for the Grand Calumet Harbor/Indiana Harbor Ship Canal and establishing partnerships for action with 14-17 potentially responsible parties;

•developing a comprehensive water quality attainment plan for the Grand Calumet Harbor/Indiana Harbor Ship Canal using "total maximum daily load" procedures;

•adding several additional stations to enhance water quality monitoring of Lake Michigan; and

•coordinating with U.S. Environmental Protection Agency on a comprehensive enforcement and compliance program for northwest Indiana.

Michigan Department of Environmental Quality (MDEQ)

Involvement of the MDEQ in LaMPs has remained relatively unchanged over the last five years. The MDEQ staff have been assigned a support role in development of LaMPs and that role will continue during further development and implementation of LaMPs.

The Area of Concern program has undergone two significant changes in the past four years. The first change was a streamlining process for RAP development in 1993. To date, it has been very successful, resulting in a renewed focus on implementation of actions that improve water quality in the Areas of Concern. Further, it is based on strong state-local partnerships.

The second change was a shift in staff from the RAP program to other high priority areas in the division. A significant resource increase in the permit program from 1994-1996 made it possible to eliminate a large backlog of expired permits for effluent discharge to the state's waters. Lansing-based staff of the Area of Concern program now serve as MDEQ contacts for Areas of Concern, providing information and technical support, as well as for referrals for funding proposals. Area of Concern coordination activities are shifting to local efforts and MDEQ district staff have become more involved in day-to-day RAP activities.

One driving force in changes to the Area of Concern program over the years has been the uncertain and variable source of funding. In Michigan, the RAP and LaMP programs are supported with funds from the Clean Water Act through U.S. EPA. These funds have proved to be so variable that little long-term planning can take place in the programs supported.

Primarily because of budget constraints, there are a number of monitoring activities that are either being implemented at a reduced level of effort or are not conducted at all. The current monitoring budget, even with the recent $500,000 state appropriation, does not allow for the full implementation of a proposed, enhanced water quality monitoring strategy released by the MDEQ in 1997.

If the Clean Michigan Initiative (CMI) receives voter approval in November 1998, Senate Bill #902, Section 8807 (4A and 6) directs the MDEQ to give first priority to expend money in the Clean Water Fund, upon appropriation, to implement programs described in the MDEQ report

entitled "A Strategic Environmental Quality Monitoring Program for Michigan's Surface Waters." Implementation of this monitoring strategy would allow the MDEQ to satisfy four goals:

1. assess the current status and condition of individual waters of the state and determine whether standards are met;

2. measure temporal and spatial trends in the quality of Michigan's surface waters;

3. provide data to support MDEQ water quality protection programs and evaluate their effectiveness; and

4. detect new and emerging water quality problems.

Michigan DEQ Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance*	⇓ (>10% decrease)
Regulatory & Enforcement	⇒ No Change (+/-10%)

Note: Based on the indicator data provided by the agency
** - In recent years, State of Michigan funds devoted to surface water quality monitoring have greatly declined (up to 80% reduction in some MDEQ monitoring activities). For example, in 1990, MDEQ had an extensive fixed station monitoring network in which water quality samples were collected from over 100 stations throughout the state. This program was eliminated in 1994, except for 13 stations on the Detroit River and 8 stations in Saginaw Bay. MDEQ currently is able to devote only 12 person years and $1,956,000 to monitoring Michigan's surface waters. However, MDEQ has recommended an enhanced monitoring program, including partnerships with federal state local units of government and interested organizations, to efficiently monitor water quality in the state.*

The monitoring strategy recommends activities to measure the chemical character of the water, sediments, and fish and wildlife tissues, and to monitor the condition of associated aquatic communities and physical habitats. It also describes activities necessary to expand stream flow measurement efforts. The strategy recognizes that monitoring activities need to be planned and conducted in partnership with outside organizations.

Minnesota Pollution Control Agency (MPCA)

In general, state derived resources for the MPCA and the Lake Superior Basin have been steady through the period from 1994 to 1997. In general, federal support to the MPCA for staff and projects has decreased slightly, due to shifts in needs and federal priorities among the Great Lakes. In addition, some funds are obtained on a competitive basis, based on project merit and lakewide need.

Interest in tributary monitoring has actually increased on the St. Louis River out of concern that the new Great Lakes Initiative

Minnesota PCA Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇑ (>10% increase)
Monitoring & Surveillance	⇓ (>10% decrease)
Regulatory & Enforcement	⇒ No Change (+/-10%)

Note: Based on the indicator data provided by the agency

(GLI) standards may be exceeded and due to concern for high fecal coliform counts in some north shore streams. Open-lake monitoring has decreased as the LaMP activities moved from assessment (Stage I) to the development of load reduction schedules (Stage II). In general, air and fish contaminant monitoring have remained fairly steady through time.

The MPCA has put a great deal of effort promulgating the GLI in Minnesota. In addition to the required components to the rule, the MPCA sought additional special water quality protection status for the basin requiring point sources of nine toxic pollutants to employ world-class "best technology in process and treatment." Twenty-two wild rice waters also received additional protection in the rule.

New York State Department of Environmental Conservation (DEC)

New York State DEC's involvement in specific GLWQA activities such as RAPs, LaMPs, and other related activities such as the Niagara River Toxics Management Plan (NRTMP) has been relatively stable over the past five years. With the completion of Stage 2 RAPs for all six Areas of Concern in New York State, efforts have shifted from problem assessment and planning to implementation of remedial measures. Even though the LaMPs that New York is involved in are in early stages, implementation of projects that will contribute to environmental improvements in Lakes Erie and Ontario will not be delayed while the plans become finalized. Implementation of the NRTMP has been underway since the mid-1980s. Many remedial projects have been completed or are near completion and efforts now include the evaluation of monitoring information to report on the results of this work seen in the environment.

New York State DEC Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇑ (>10% increase)
Monitoring & Surveillance	⇓ (>10% decrease)
Regulatory & Enforcement	⇒ No Change (+/-10%)

Note: Based on the indicator data provided by the agency

Resources targeted for problem assessment supporting LaMP and RAP development have been reduced in recent years. However, some resources have been shifted to implementation of activities, projects, and recommendations supporting our geographically-based planning/management efforts and additional, new resources have been dedicated for project implementation.

Two programs in particular are noteworthy: the Clean Water/Clean Air Bond Act (Bond Act) and the New York State Environmental Protection Fund (EPF). In November 1996, the voters of New York State approved the Bond Act dedicating $1.75 billion for environmental projects statewide. Bond Act funds will be used for projects related to open space acquisition, flood prevention and control, safe drinking water, solid waste initiatives, cleanup of abandoned "brownfield" sites, and air quality improvement projects. In addition, the Bond Act provides

funds to municipalities specifically for clean water projects related to the implementation of geographic management plans, including RAPs and LaMPs. Under the area of water quality improvements, the amount specifically targeted for the Great Lakes watershed, including the Finger Lakes and Onondaga Lake, is $125 million. Over $37 million of this amount has already been approved for specific water quality improvement projects in the Great Lakes Basin.

The EPF was created in July 1993 as an annually budgeted, special-revenue fund used for a variety of State and local environmental programs, including open space conservation, farmland protection, municipal landfill closures, municipal waste reduction and recycling projects, local waterfront revitalization plans, and other special area planning. Statewide EPF appropriations have grown as follows: $31.5 million in 1994, $42.5 million in 1995, $100 million in 1996, $100 million in 1997, and $125 million in 1998.

While DEC has undertaken the development of specific activities identified in the GLWQA such as RAPs and LaMPs, the implementation of most of the environmental protection and restoration, and natural resource programs, is done through our "core program" activities. The resources associated with these activities are not specifically identified with the many regional geographic management programs underway across New York State that focus on the restoration of specific, regional problems. However, the contribution of "core programs" (particularly monitoring and surveillance and regulatory/enforcement activities) to the protection of environmental quality in these regions is critical to the success of the regional geographic management programs.

Ohio Environmental Protection Agency (EPA)

In the areas of permitting, enforcement, monitoring and surveillance activities, LaMP, and RAP activities, the focus of Ohio EPA has not changed during the time period in question relative to its emphasis on Lake Erie. The National Pollutant Discharge Elimination System (NPDES) permitting program has undergone a major change this year in the way that the antidegradation rule is implemented in Ohio. A significant amount of resources are now devoted to this process. As with most organizations, there are insufficient resources to conduct all of the activities that the agency would like to conduct in the performance of required jobs. However, there is no single program function that has been eliminated due to resource shortages. The Ohio EPA strives to maintain a balanced program so that all program elements are addressed.

The Ohio EPA recently completed a very resource intensive rule-making required, in part, to satisfy the requirements of the Great Lakes Water Quality Initiative. Much of the work to support this rule-making was conducted by permitting staff. As a result of that rule-making, modifications to the workload for other functions, such as water quality modeling, have had to be made.

From 1994-1997, a significant change took place in Annex 2 activities in Ohio. Stage 1 assessments were completed for each of Ohio's Areas of Concern. As each RAP shifted direction from the assessment and report writing activities of Stage 1 to implementation of remedial actions in Stage 2, a more aggressive and diversified approach to funding was needed. Federal, state, local, and private monies were sought, often in coordination and conjunction with each other, to fund activities that would restore beneficial uses. The years 1995, 1996, and 1997 showed an increase in federal funds from the Great Lakes National Program Office and the U. S. Army Corps

of Engineers, matched with local and state funds, to implement restoration activities in the Areas of Concern. Since 1994, the Ohio Lake Erie Protection Fund has made funding research and implementation of projects that support the RAPs and the Lake Erie LaMP a priority.

Ohio EPA Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇑ (>10% increase)
Regulatory & Enforcement	⇒ No Change (+/-10%)

Note: Based on the indicator data provided by the agency

The Ohio EPA is constantly striving to implement more effective ways of conducting its business. Since 1996, the Division of Surface Water has expended over $1.9 million for the development of the Surface Water Information Management System (SWIMS). This system will greatly enhance the Division's ability to process data and will automate many of its routine functions. In addition to that, Ohio EPA is exploring the use of general permits to address many of the small dischargers that exist in the State. Steps have been taken to review both the permitting and enforcement processes in general to ensure that resources are being used as effectively as possible.

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA)

The Ministry has defined four core businesses: Research/Technology Transfer, Investment Attraction/Market Development, Rural Economic Development, and Risk Management. The Ministry's Research and Technology Transfer activities relate to the Canada-Ontario Agreement, especially the goals and objectives of RAPs and LaMPs.

OMAFRA Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)

Note: Based on the indicator data provided by the agency

OMAFRA has developed new partnerships with private and public sector organizations as a means of providing efficient and effectively delivery of services. An example of this is a formalized partnership between the OMAFRA and the University of Guelph. In this partnership, there is a comprehensive and integrated research program on six areas including natural resources and the environment.

OMAFRA is working with the Ministry of the Environment, local Conservation Authorities, Ontario Federation of Agriculture, the Ontario Soil and Crop Improvement Association, and the Ontario Farm Environmental Coalition in the development of nutrient management programs in Ontario. Good examples of OMAFRA's proactive involvement in partnerships to address environmental issues include:

- $5.6 million from the Agricultural Adaptation Council's CanAdapt Program for the

Environmental Farm Plan program;

•$2.5 million for the National Soil and Water Conservation Program to address water quality, nutrient management, environmental management systems and soil management; and

•$30 million for three years for the Rural Job Strategy Fund to cost share among different sectors on projects which address water quality.

Ontario Ministry of Environment (MOE)

Historically, progress has been described by the Parties, jurisdictions, and the IJC according to the number of beneficial uses restored and the Areas of Concern delisted. Because the environment takes time to respond to management actions, rates of natural recovery will influence the full restoration of beneficial uses. Ontario MOE supports the WQB position that there is a need to measure incremental, step-wise gains that have been achieved at each Area of Concern. Based on a 1998 status report of RAP progress and changes in environmental quality at the 17 Canadian Areas of Concern, environmental recovery has been documented across all locations, with close to 60% of the actions required to restore beneficial uses already completed.

Ontario MOE Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇓ (>10% decrease)
Regulatory & Enforcement	⇒ No Change (+/-10%)

Note: Based on the indicator data provided by the agency

Tangible environmental improvements have been measured throughout the Great Lakes Basin as an undeniable consequence of the Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem. These include reductions in contaminant loadings from point and nonpoint sources, removal and treatment of toxic sediment, more beach openings, upgrading and optimization of municipal sewage treatment plants, abatement of combined sewer overflows, and rehabilitation of fish and wildlife populations in conjunction with restoration of habitat along Lake Superior, Lake Huron, Lake Erie, Lake Ontario, and the Connecting Channels. Since 1987, thousands of hectares of wetlands and hundreds of kilometers of streams and rivers have been rehabilitated in Areas of Concern resulting in improved populations of fish and wildlife. Since 1990, thousands of cubic meters of contaminated sediment have been removed and treated, resulting in declines in pollutants entering fish and wildlife. More fish can now be consumed from the Great Lakes with fewer restrictions.

Further specific examples of environmental recovery include beaches that now remain open in parts of Hamilton Harbour and Toronto due to abatement of combined sewer overflows. Recovery of sport fish and forage fish populations has been documented in conjunction with habitat rehabilitation efforts in Nipigon Bay, Thunder Bay, Spanish Harbour, Collingwood Harbour, and Hamilton Harbour. Contaminated sediment has been removed from St. Marys River, Severn

Sound, Collingwood Harbour, Niagara River, Hamilton Harbour, and Metro Toronto. The zone of sediment contamination in the St. Clair River has decreased significantly from 64 km to intermittent pockets within a six km zone due to reduction of industrial pollutant loadings to the system and industrial cleanup efforts. Farm plans are underway with best management practices resulting in improved stream and receiving water quality in Severn Sound, Niagara River, and Bay of Quinte. Improved water clarity and oxygen penetration in Collingwood Harbour, Hamilton Harbour, and Bay of Quinte are the result of innovative upgrades to sewage treatment plants.

The Ontario MOE remains committed to cleaning up the Great Lakes and other provincial bodies of water. The Ministry has been actively working over the past 10 years with communities to fix the most serious problems. To date, the province has invested over $287 million on RAP related activities. At this point in time, the Ministry feels that the best strategy is to concentrate on remediation and prevention in a manner that is cost effective and results in the greatest environmental improvement. Ontario MOE will continue to work with all levels of government to meet its commitments by focusing on remedial activities, innovative solutions, and partnerships with industry and volunteer groups.

Throughout the basin, governments and stakeholders have pointed out the need for a private-public partnership that facilitates the establishments of trusts. Ontario MOE supports this priority and is investing in research to develop an innovative technique to secure new investments in environmental restoration. An independent not-for-profit organization can fill the gap between community needs and existing granting sources, and is a vehicle to overcoming obstacles for large scale remediation efforts such as sediment cleanup. Similarly, Ontario MOE is participating with the IJC in exploring methods to valuate economic as well as environmental benefits of environmental rehabilitation.

Ontario Ministry of Natural Resources (OMNR)

From 1992 to 1996, MNR had a Great Lakes Branch which provided policy and field delivery implementation of MNR's Great Lakes program which focused on the fisheries management and fish community monitoring elements of the Great Lakes aquatic ecosystem. In 1996, MNR re-organized and the policy aspects of our Great Lakes program are now delivered primarily by two Branches - Fish and Wildlife, and Lands and Natural Heritage. The Great Lakes Management Units, which were created in 1992 and still deliver fisheries enforcement, management, and fish community monitoring programs for the Great Lakes, now report to Fish and Wildlife Branch. Provincial fisheries policy and program development, and the provincial fish culture program, also reside within Fish and Wildlife Branch. The Lands and Natural Heritage Branch is responsible for policy related to non-indigenous species, and to water quantity and levels control for the Province.

MNR's land-based Districts deliver some fish population monitoring in the tributaries and do the permitting for Great Lakes waters and shorelines to which they are adjacent. The districts are also responsible for land and water use management for the watersheds within the Great Lakes Basin. Funding related to District activities, fisheries research, and the former Great Lakes Branch were not readily available.

Operating dollars for the Great Lakes Management Units to deliver enforcement, fish community

monitoring, and fisheries management have been reduced by about 73% when comparing fiscal year 1997/98 to 1992/93 funding levels. During the same period, full-time staff numbers have been reduced 29% and contract staff by 79%, for a combined reduction of about 40%. The reductions have been the greatest for the areas of fish population monitoring, direct RAP funding, and Great Lakes Basin policy and program development. Direct support for fisheries management and enforcement activities has remained relatively constant. Funding reductions have occurred over the past several years.

Ontario MNR Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇓ (>10% decrease)
Regulatory & Enforcement	⇒ No Change (+/-10%)

Note: Based on the indicator data provided by the agency

Reduced funding with MNR is not unique to the delivery of its Great Lakes program. MNR's Fish and Wildlife program, from which Great Lakes funding originates, has experienced lower budgets and staffing over the past five years. Funding for Fish and Wildlife consists of dollars from a special purpose account, with a funding source of licence revenues, royalties, and fines, and from governments funds.

Many of MNR's broader fish and wildlife program activities also support Great Lakes activities. For example, the new Fish and Wildlife Conservation Act will offer better regulatory support for fish and wildlife management throughout the province. "Land for Life" is a regional planning approach which will influence resource management for Great Lakes watersheds. MNR has numerous client partnerships, such as a new business relationship with the commercial fishery, the stewardship program, and community fisheries involvement projects which offer support to Great Lakes Basin resource management.

Pennsylvania Department of Environmental Protection (DEP)

Pennsylvania has greatly increased its role in the Great Lakes over the past decade. In recognition of this heightened responsibility, Governor Tom Ridge created the Office of the Great Lakes in 1995 to devote full-time attention to Great Lakes issues.
The Presque Isle Bay Public Advisory Committee (PAC), which oversees the development of the RAP to restore beneficial uses in the Bay, continues to enjoy strong membership and support from the local community. Funding for this RAP remains constant in terms of federal dollars, with additional special projects and studies

Pennsylvania DEP Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇒ No Change (+/-10%)
Regulatory & Enforcement	⇑ (>10% increase)

Note: Based on the indicator data provided by the agency

funded by the state. Pennsylvania DEP and the Office of the Great Lakes remain committed to the RAP process as a means to restore and protect beneficial uses in Presque Isle Bay.

In 1997, the Department's Office of Pollution Prevention and Compliance Assistance was awarded a $75,000 grant from U.S. EPA's Great Lakes National Program Office to initiate a mercury reduction program in the Lake Erie basin. The project's objective is to advance the use of pollution prevention practices and to construct a framework for business, government, and the community at large to reduce the use and ultimate release of persistent toxic substances in a collaborative effort.

Working in close cooperation with Penn State University, the Governor's Office, and the Office of the Great Lakes, the National Oceanic and Atmospheric Association recently approved funding for a Pennsylvania Sea Grant Program. Initial projects include:

1) the study and abatement of nonpoint sources of pollution in the Lake Erie Watershed;

2) the study of contaminated sediments and their relationship to the presence of neoplasms in aquatic organisms; and

3) the impact of zebra mussels on the area's ecology and economy.

U.S. Environmental Protection Agency (U.S. EPA)

U.S. EPA is performing all of the GLWQA program elements for which it is responsible. U.S. EPA resources are fairly stable and commitments to Great Lakes protection and restoration are being maintained. Although U.S. EPA has achieved much success in the delivery of programs, much work remains.

Highlights of how program delivery has changed include:

- Community Based Environmental Protection: This program involves community stakeholders in a variety of planning processes. It is results oriented and has a geographical focus.

- Open Lake Monitoring/Lake Michigan Mass Balance Study (LMMB): U.S. EPA's open lake monitoring program was essentially put on hold for 1994-1995 (it resumed in 1996) to marshall resources for the LMMB/Enhanced Monitoring Program. It is the largest multi-media toxic contaminant monitoring and modeling project ever undertaken.

- Great Lakes Water Quality Guidance: This guidance helps establish consistent goals for state water quality management plans, which are crucial to the success of the international multi-media efforts to protect and restore the Great Lakes. U.S. EPA estimates that implementation of the Guidance will result in almost 450,000 kg (one million pound) reduction of contaminants entering the system.

- Drinking Water: Programs under the Safe Drinking Water Act (SDWA) of 1996 are providing

a new era of cost-effective protection of drinking water quality, state flexibility, and citizen involvement. The centerpiece of the SDWA is the Drinking Water State Revolving Fund, a mechanism to assist public water systems to finance the costs of infrastructure improvement. State Source Water Assessments will similarly identify those areas that are sources of public drinking water, assess water systems' susceptibility to contamination, and inform the public of the results.

U.S. EPA Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇒ No Change (+/-10%)
Regulatory & Enforcement	⇑ (>10% increase)

Note: Based on the indicator data provided by the agency

•Air Deposition: U.S. EPA has issued rules to protect public health by significantly reducing the harmful air pollution that comes from medical waste incinerators, a major source of mercury and dioxin air emissions. Other efforts have targeted municipal waste combustors and the development of Maximum Achievable Control Technology standards to reduce emissions of 188 hazardous air pollutants.

Examples of new and potentially more effective program delivery include:

•Great Lakes Binational Toxics Strategy: This Strategy was signed in 1997 and sets reduction targets for specific persistent toxic substances.

•Cluster Rule for Pulp and Paper: This combined air and water "cluster rule" for the pulp and paper industry was signed in 1997 and will significantly reduce toxic air emissions.

Wisconsin Department of Natural Resources (DNR)

The Wisconsin DNR has restructured itself to be better able to manage the state's programs in a way which improves and protects the quality of the environment to attain a sustainable, biologically diverse ecosystem. The Department is now organizing its efforts for locally-based and ecosystem-driven management. These efforts are based on 23 watersheds in the state which are identified as Geographic Management Units (GMU).

Wisconsin DNR Survey Results

Indicator	*% Change (1997 vs. average of 1994-97)*
Annex 2	⇓ (>10% decrease)
Monitoring & Surveillance	⇓ (>10% decrease)
Regulatory & Enforcement	⇓ (>10% decrease)

Note: Based on the indicator data provided by the agency

It should not be a surprise to anyone

involved in the Great Lakes Region that budget allotments to government programs have been reduced. This is a function of the economic and political times we are in. What this has meant in Wisconsin is that the DNR is more actively pursuing partnerships to implement ecosystem management, as was envisioned in the RAP and LaMP processes designed in the GLWQA. The DNR is maintaining, and perhaps increasing, its efforts due to our reorganization and the more efficient resource based ecosystem management approach now being used statewide.

Wisconsin has made significant progress in implementing actions identified in both RAPs and LaMPs due to the partnerships which have been formed. Ruck Pond in the Milwaukee River Basin was dredged by the industry responsible for the PCB contamination. The City and County of Milwaukee joined with the DNR to remove the North Avenue Dam. This has restored upland and riverine habitat in this highly urbanized Area of Concern. Similar partnerships are formed with the Green Bay and St. Louis River Areas of Concern, and joint implementation efforts are underway. In addition, mercury use reduction efforts are continuing in major municipalities within the Great Lakes Basin and cooperatively with utilities within the Lake Superior Basin.

SURVEY RESULTS

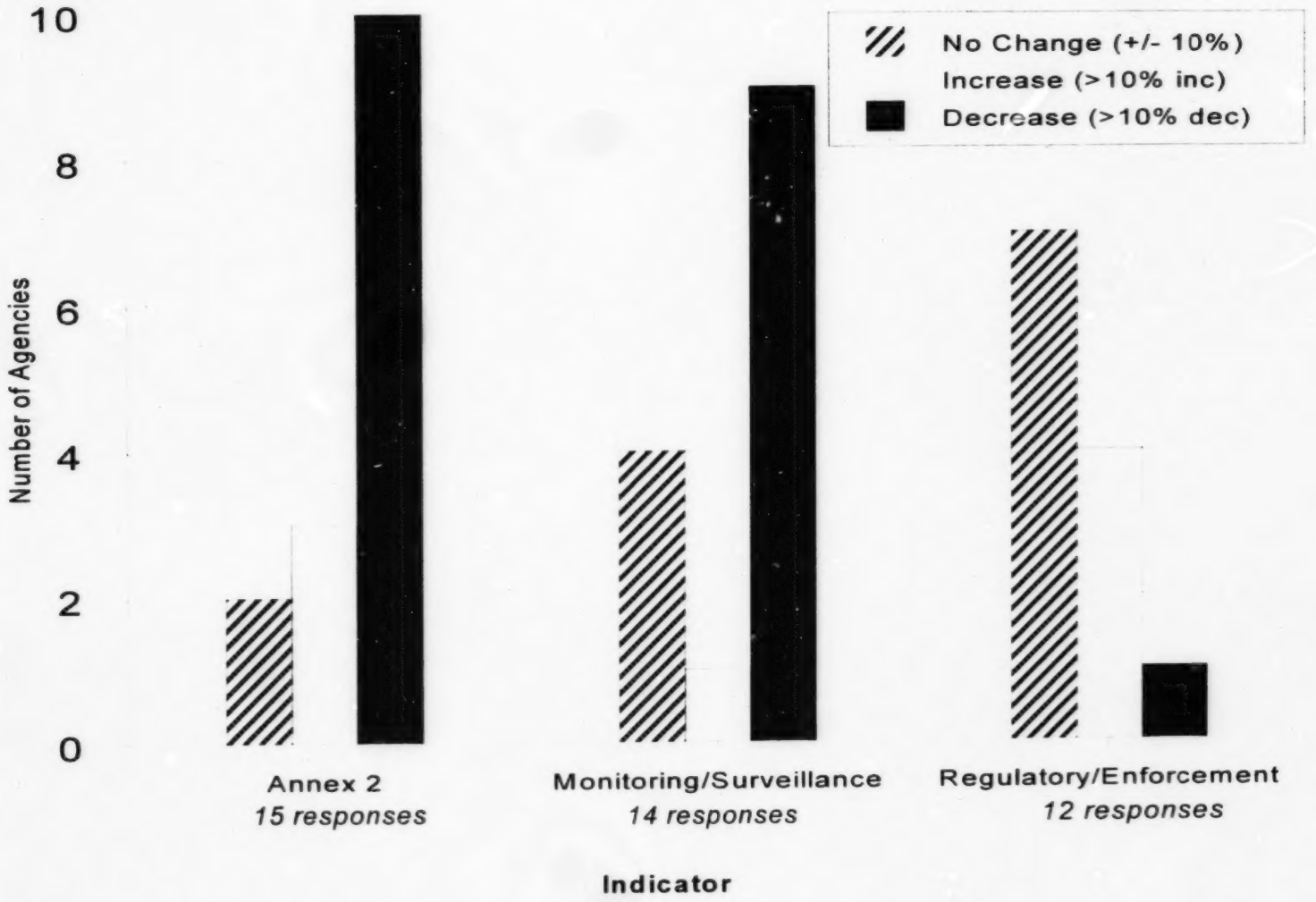
The WQB compiled the data by indicator for which each agency reported on and analyzed the data a number of ways. Because several agencies showed high year-to-year variability, the WQB chose to draw its conclusions based on a comparison of 1997 values with the average of 1994-1997. Seventeen agencies responded to the survey, however, two agencies (Public Works and Government Services Canada and Transport Canada) did not provide resource data as the nature of their program responsibility had no or very limited involvement with the survey indicators.

Annex 2 (RAP and LaMP Programs)

Fifteen agencies provided information on programs relating to Annex 2. Based on the comparison of 1997 values with the average of 1994-1997, 10 of the 15 agencies experienced a funding decrease (>10% decrease), three of 15 an increase (>10% increase), and two of 15 showed no change (less than or equal to a 10% increase or decrease) (Figure 1). Based on the funding indicators provided, the two largest federal agencies (Environment Canada and U.S. EPA) both showed a greater than 10% decrease in Annex 2 funding. Of the five jurisdictions with the most Great Lakes shoreline (Ontario, Michigan, Ohio, Wisconsin, and New York), four showed a decrease in Annex 2 funding (Ohio, Ontario, Wisconsin, and Michigan), one showed an increase (New York). Of the four jurisdictions with relatively small amounts of Great Lakes shoreline (Indiana, Pennsylvania, Minnesota, and Illinois), two agencies showed a decrease in Annex 2 funding (Indiana and Pennsylvania), one agency showed an increase in Annex 2 funding (Minnesota), and one agency showed no change (Illinois).

Eleven agencies provided data on RAP expenditures. Based on the standard 1997 comparison to the average of 1994-1997 for the eleven agencies providing indicator data, five agencies showed a decrease (>10% decrease), two showed an increase (>10% increase), and four showed no change (less than or equal to a 10% increase or decrease).

Figure 1. The number of agencies reporting either an increase, decrease, or no change in resources allocated to Annex 2, Monitoring and Surveillance, and Regulatory and Enforcement activities based on a comparison of 1997 to the average of 1994-1997.



Nine agencies provided data on LaMP expenditures. Based on the standard 1997 comparison to the average of 1994-1997 for the nine agencies providing indicator data, three agencies showed a decrease (>10% decrease), five showed an increase (>10% increase), and one showed no change (less than or equal to a 10% increase or decrease).

Monitoring and Surveillance

Fourteen agencies provided information on programs relating to monitoring and surveillance activities. Based on the comparison of 1997 to the average of 1994-1997, nine of the 14 showed a decrease in funding (>10% decrease), one of 14 an increase (>10% increase), and four of the 14 showed no change (less than or equal to a 10% increase or decrease) on the indicators they selected (Figure 1). Of the four federal agencies (Environment Canada, U.S. EPA, Health Canada, Department of Fisheries and Oceans Canada) two showed no change (Environment Canada and U.S. EPA) and two experienced a funding decrease (>10% decrease) (Health Canada and Department of Fisheries and Oceans Canada). Of the five jurisdictions with the most Great Lakes shoreline (Ontario, Michigan, Ohio, Wisconsin, and New York), four showed a decrease in monitoring and surveillance funding (Michigan, New York, Wisconsin, and Ontario), and one jurisdiction showed an increase (Ohio).

Five agencies reported on tributary monitoring. Based on the standard 1997 comparison to the average of 1994-1997 for the five agencies providing indicator data, three agencies showed a decrease (>10% decrease) and the other two showed no change (less than or equal to a 10% increase or decrease).

Eight agencies provided data on open lake monitoring. Based on the standard 1997 comparison to the average of 1994-1997 for the eight agencies providing indicator data, three agencies showed a decrease (>10% decrease), one agency showed an increase (>10% increase), and four showed no change (less than or equal to a 10% increase or decrease).

Six agencies reported on air deposition monitoring. Based on the standard 1997 comparison to the average of 1994-1997 for the six agencies providing indicator data, two agencies showed a decrease (>10% decrease) and four showed no change (less than or equal to a 10% increase or decrease).

Seven agencies reported on fish contaminant monitoring. Based on the standard 1997 comparison to the average of 1994-1997 for the seven agencies providing indicator data, three agencies showed a decrease (>10% decrease), one agency showed an increase (>10% increase), and three agencies showed no change (less than or equal to a 10% increase or decrease).

Five agencies reported on fish population monitoring. Based on the standard 1997 comparison to the average of 1994-1997 for the five agencies providing indicator data, two agencies showed an increase (>10% increase), one showed a decrease (>10% decrease), and two agencies showed no change (less than or equal to a 10% increase or decrease).

Regulatory and Enforcement Activities

Twelve agencies provided information on regulatory and enforcement activities. Based on the comparison of 1997 values to the average of 1994-1997, four of the twelve agencies experienced a funding increase (>10% increase), one of the twelve agencies experienced a funding decrease (>10% decrease), and the remaining seven showed no change (less than or equal to a 10% increase or decrease) (Figure 1). The U.S. EPA showed an increase (>10% increase) in resources dedicated to regulatory and enforcement activities, and Environment Canada showed no change (less than or equal to a 10% increase or decrease). Of the five jurisdictions with the most Great Lakes shoreline (Ontario, Michigan, Ohio, Wisconsin, and New York), four showed no change (less than or equal to a 10% increase or decrease) in funding (Ontario, Michigan, Ohio, and New York), and one showed a decrease (>10% decrease) in funding (Wisconsin). Of the four jurisdictions with relatively small amounts of Great Lakes shoreline (Indiana, Pennsylvania, Minnesota, and Illinois), three jurisdictions showed an increase in regulatory and enforcement funding (Illinois, Indiana, and Pennsylvania), and one showed no change (Minnesota).

Ten of the agencies provided data on enforcement and compliance expenditures. Based on the standard 1997 comparison to the average of 1994-1997 for the ten agencies providing indicator data, four agencies showed an increase (>10% increase) and six agencies showed no change (less than or equal to a 10% increase or decrease).

Six agencies provided data on permitting activities. Based on the standard 1997 comparison to the average of 1994-1997 for the six agencies providing indicator data, one showed an increase (>10% increase), one showed a decrease (>10% decrease), and four showed no change (less than or equal to a 10% increase or decrease).

DISCUSSION

The WQB is pleased to report that, in general, agency support for regulatory and enforcement programs has been sustained or even increased slightly. These agencies should be congratulated on continued support for regulatory and enforcement activities.

However, based on the survey conducted by the WQB, agency support for Annex 2 and monitoring/surveillance has generally decreased. In general, the WQB does not encourage a "dollar for dollar" replacement of these program resources. For example, International Atmospheric Deposition Network (IADN) monitoring has found five years of "no detect" measurements for certain parameters and therefore has stopped that monitoring. It doesn't make sense to continue to monitor those parameters.

Monitoring and surveillance should be targeted toward clear priorities. The WQB recognizes the important work of the Parties' State of the Lakes Ecosystem Conference (and the IJC's Indicators Implementation Task Force) to identify a core set of indicators that reflect the state of all major Great Lakes ecosystem components. These efforts are critical to establishing focused and effective monitoring and surveillance programs for management.

Again, monitoring and surveillance programs must be focused on management priorities. For example, if management agencies want to address the current concern for the relationship between phosphorus loadings and fish productivity in Lake Erie, detailed information on phosphorus loadings is required to support modeling efforts. Dolan and McGunagle (1998) have reported that out of 29 Lake Erie tributaries that were originally monitored in 1980 in response to Pollution from Land Use Activities Reference Group (PLUARG) recommendations, only 11 tributaries were monitored in 1995. These reductions are such that credible whole lake phosphorus loadings can no longer be estimated. If the intent of governments is to understand the relationship between phosphorus loadings and fish productivity to better manage Lake Erie, then there is a need to reinstate and optimize tributary monitoring lakewide so that this important information can continue to be collected in a cost-effective manner.

Many agencies recognize decreased monitoring and surveillance capability, and have proposed program enhancements. For example, MDEQ (1997) has reported up to an 80% reduction in some monitoring activities and recommended an enhanced monitoring program which would include 16 person years and $3,194,000 annually to implement its comprehensive surface water quality monitoring strategy. The IJC should support this and other proposals from the agencies to strengthen monitoring and surveillance activities.

Relative to the finding that governmental resource support for Annex 2 (RAPs and LaMPs) has generally decreased, the WQB notes that a number of agencies reported that many RAPs and LaMPs are moving from the planning phase to the implementation phase and that this, in part, can explain some of the reduced resource support. The WQB survey did not pick up many of the mainline programs which implement remedial and preventive actions. In addition, there are a number of creative partnerships that have been developed and are being developed which share responsibilities for program delivery, create efficiencies, and build the capacity to restore uses as called for in the GLWQA. The Water Quality Board recognizes the need to identify how effectively governments are assisting other organizations (e.g., conservation authorities, county and municipal governments, watershed councils, not-for-profit organizations) in performing the functions previously performed by state/provincial/federal governments. As noted by the WQB (1996) in its "Position Statement on the Future of Great Lakes RAPs", federal, state, and provincial governments must continue to provide leadership and resources to fulfil commitments to RAPs as articulated in the GLWQA.

There is no doubt that governments are making changes in what they do and how they deliver programs. As part of this evolution, a number of new initiatives and creative ideas have emerged. For example, Ontario recently announced the allocation of $5 million for its Great Lakes Renewal Foundation (i.e., an independent, not-for-profit organization) designed to encourage Great Lakes cleanup, pollution prevention, capacity building, and scientific research. This $5 million is intended to be seed money to encourage investments by industry and the private sector. In addition, the State of Michigan has proposed a $675 million Clean Michigan Initiative. This initiative, if funded, would provide $25 million for sediment remediation at nine locations in Michigan (eight of which are Areas of Concern which have RAPs). Again, the IJC should support these initiatives and other proposals from the agencies to build the capacity to restore uses through RAPs and LaMPs.

The WQB recognizes the important, complementary work of the IJC's Council of Great Lakes Research Managers (CGLRM) on funding reductions for Great Lakes science (IJC 1997). Based on a survey of 31 research programs which responded to a CGLRM survey, Great Lakes research funding peaked in 1994 and was projected to decline by as much as 50% by 1997. Similarly, research salary budgets peaked in 1994 and were projected to decrease by 35% by 1997. The number of researchers followed a similar trend. The WQB notes that for Great Lakes management to be effective in the future it must have an adequate knowledge base which is provided by both research and monitoring/surveillance. Therefore, targeted research, monitoring, and surveillance must be seen as government priorities to ensure effective management of the Great Lakes. Both the CGLRM (IJC 1997) and the WQB have also noted the loss of intellectual capability as a result of resource cuts. As research and surveillance and monitoring positions are eliminated, it will be difficult to regain such expertise and intellectual capability in the near future. For example, it often takes ten years to train and develop effective researchers.

FINDINGS

As requested by the Commission, the WQB has reviewed government resources and changing program thrusts as they relate to monitoring and surveillance activities, Annex 2 commitments, and regulatory and enforcement activities. The Board reiterates that geographical, political, and administrative differences among the jurisdictions/Parties represented a considerable challenge. Based on the WQB's review of narrative information and survey information (1994-1997) provided by the agencies who responded, the following findings are made:

- there is no doubt that governments are making changes in what they do and how they deliver programs (dollars are not a good measure of progress; the WQB does not encourage new investments be necessarily made following historical priorities);

- a one-to-one relationship does not exist between resource expenditures and program delivery;

- there are a number of creative partnerships that have been developed and are being developed which share responsibilities for program delivery, create efficiencies, and build the institutional capacity to achieve ecosystem results;

- for Annex 2 activities, ten of the 15 agencies providing indicator data experienced a decrease in funding (>10% decrease), three of the 15 experienced an increase in funding (>10% increase), and two of the 15 showed no change in funding (less than or equal to a 10% increase or decrease), based on a comparison of 1997 data with the average of 1994-1997;

- the IJC should support new and creative initiatives (e.g., Ontario's Great Lakes Renewal Foundation, Clean Michigan Initiative) which build the capacity to restore uses through RAPs and LaMPs;

- for monitoring and surveillance activities, nine of the 14 agencies providing indicator data experienced a decrease in funding (>10% decrease), one of the 14 experienced increase in funding (>10% increase), and four of the fourteen showed no change in funding (less than or

equal to a 10% increase or decrease), based on a comparison of 1997 data with the average of 1994-1997;

•the IJC should support agency proposals (e.g., MDEQ 1997) to enhance monitoring and surveillance programs which target key ecosystem indicators;

•for regulatory and enforcement activities, four of the twelve agencies providing indicator data experienced an increase in funding (>10% increase), seven of the twelve showed no change in funding (less than or equal to a 10% increase or decrease), and the remaining one experienced a decrease in funding (>10% decrease), based on a comparison of 1997 data with the average of 1994-1997;

•some agencies reported substantial reductions in resource expenditures for certain indicators;

•there is a need to identify how effectively governments are assisting other organizations/institutions in performing the functions previously performed by state/provincial/federal governments (e.g., certain functions under RAPs are now being carried out by county or municipal governments, conservation authorities, watershed councils, or nonprofit organizations); and

•continued emphasis must be placed on evaluating program effectiveness based on measuring ecosystem results.

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